SECTION 1

PRECONSTRUCTION PLANNING

1-1 INTRODUCTION

Preconstruction planning at the beginning of a project will ensure that the deck is constructed in accordance with the Standard Specifications and also can help detect problems that might arise during construction. Preconstruction planning includes:

(1) Discussions and a conference with the Contractor,

(2) Review of our responsibilities

(3) Familiarization with the plans and specifications that relate to the planned work.

The subject of bridge deck construction may be introduced at the preconstruction conference especially if there are any unusual conditions. The deck construction conference with the Contractor should be scheduled prior to stem and soffit construction. The discussion at the preconstruction conference might include such items as scheduling, grade control, access and operational considerations, falsework requirements, sequence of concrete placement, and concrete quality control and strength requirements.

After the preconstruction conference, the following items should be reviewed by the Structure Representative:

1-2 CONCRETE MIX AND MATERIALS

A complete discussion of concrete mixes and materials can be

found in the "Concrete Technology Manual". The following is an abbreviated list of pertinent items:

1-2.1 AGGREGATES (Standard Specifications 90-2&3)

1. Source
2. Natural. or manufactured
3. Testing and gradation
4. Quantity available
5. Moisture control
6. Lightweight concrete

1-2.2 WATER CEMENT RATIO

1. Aggregate particle size and configuration
2. Admixtures
3. Strength requirements (contract plans)

1-2.3 ADMIXTUROES (Standard Specifications 90-4 or Specials)

1. Type(s) specified
2. Type(S) permitted (Bridge Construction Records & Procedures 100-4)
3. Compatibility of types
4. Effect on strength, shrinkage and workability
5. Testing and approval (prior to incorporating in work)
6. Dispensing and calibration

1-2.4 MIX DESIGNS AND TRIAL BATCHES (Standard Specifications 90-l&9)

1. Mix designs submitted by the Contractor and approved by the Structure Representative

2. Cement content and strength requirements (bridge decks 7-sack min.)
3. Admixture(s)
4. Combined grading of aggregates
5. Type of cement
6. Workability, placing and finishing characteristics
7. Scheduling of-trial batches
8. Uniformity (Using the same concrete mixes as other projects supplied by the same plant).

1-3 BATCH PLANTS (Standard Specifications 90-5&6)

A field review of the Contractor's proposed batch plant should be made at an early stage in the contract for specification compliance. This review is usually made by District personnel, using forms HC-12 & HC-14, (sample in Appendix 1).

It is a good idea for Structure's personnel to be aware of what the review involves, and to also check the following items:

1. Aggregate storage and handling (intermingling, contamination, moisture control, etc.)
2. Cement storage (protection, weighing, venting, sampling, quantity available, etc.)
3. Admixture(s) (introduction and measurement)
4. Water (adjustment for aggregate moisture content variation)
5. Plant equipment and measuring devices (compliance with specifications, condition and maintenance)

6. Transit-mix trucks (compliance with specifications, capacity, condition and maintenance)
7. Hot and/or cold weather provisions
8. Production capacity and haul time
9. Inspection facilities provided
10. Delivery ticket format and information

1-4 DECK CONSTRUCTION CONFERENCE

Prior to stem and soffit forming, a meeting should be held with the Contractor to discuss the particular features of the deck being constructed.

It is important that the Engineer understand the Contractor's proposed methods so that he can determine if these methods are compatible with the specifications and requirements of the contract. This is the time that any differences should be resolved. The Engineer should also discuss any contingency plan that the Contractor has for problems that may arise.

The following is a general outline of what this meeting might entail but the particulars of each job are the responsibility of the Engineer to determine and bring out in discussion:

1-4.1 SEQUENCE AND LIMITS OF PLACEMENT

1. Do the plans and specifications require certain sequences?
2. Does the Contractor plan on any wide pours?
3. Will the Contractor place any longitudinal or transverse

joints other than those shown on the plans? (Standard Plans BO-5)

4. Are longitudinal joints located on or close to a lane line?
5. Is stage construction required?
6. Are there any long standing hinges? (Appendix 2)
7. What quantity of concrete is required for the various deck segments?
8. Will placement interfere with public traffic, existing power lines or other obstructions?
9. In what direction is the pour?
10. Are there any closure pours?
11. Does the contract provide for falsework release alternatives?

1-4.2 LOCATION OF FINISHING MACHINE RAIL SUPPORTS AND CONSTRUCTION JOINTS

1. Where does the Contractor plan on placing the rail supports for the strike-off machine?
   a. edge of deck
   b. at longitudinal construction joints.
   c. at exterior or intermediate girder location.
2. Type of structure may influence screed rail position and support.
3. Refer to details for longitudinal. joints in the Standard Plans. (Location at the girder is preferred Standard Plans BO-5)
4. Evaluation of the support system of screed rails for deflection, rotation, and stability.

5. Grade control at longitudinal and transverse construction joints?
6. Grade control for screed rails and method of establishing grade.
7. Stability of bulkheads for construction joints.

1-4.3 CONCRETE CONVEYANCE, PLACEMENT METHOD AND RATE

1. Length and time of haul from batch plant to construction site.
2. Can the concrete be delivered at a uniform rate?
3. Will delivery, placement, and finishing of concrete cause a hazard to the public?
4. After delivery to the site, what placing method will be used to place the concrete in the deck? (pump, crane, belt, etc.)
5. Will the placing method require additional support considerations in the formwork or reinforcing steel? (i.e., are belts supported by the lost deck system)
6. Rate of placement anticipated - Is this consistent with the rate of delivery and how will this affect the surface finishing capabilities?
7. Proper vibration of concrete after placement (number of vibrator men).
8. Penetration required - How will this affect method of placement (pumping) or the capability of the strike off machine to properly work a given penetration concrete.

(Standard Specifications 90-6.06)

9. will conveyance and placement be interrupted for any reason such, as moving the placing and/or finishing equipment? provisions for keeping concrete fresh)
10. Will the placement method cause segregation or result in a non-uniform or uneven pour front?
11. Where does the Contractor propose to clean out trucks?

1-4.4 FINISHING METHOD (Standard Specification 514.17)

1. Finishing is the Contractor's responsibility under the end-result specification
2. Engineer's interest is in end results of:
   a) Smoothness
   b) Surface texture
   C) Surface crack intensity
   d) Physical properties of the concrete (plastic and final states) and cure.
3. The Engineer's responsibility is to establish grade control points unless construction staking is a contract item.
4. Special finishing Considerations:
   a) Lightweight concrete
   b) Adverse weather conditions
   C) Overlays

1-4.5 FINISHING CREW AND OPERATORS

Because the specifications do not require specific methods for deck finishing, the Contractor decides on the size and classification of the crew. However, the staffing of a deck pour

is an important area of discussion with the Contractor since the staffing effects the time required which affects concrete delivery, which may be delayed by traffic, etc., etc.

The degree of mechanization and the individual abilities of workmen will vary from job to job, but a recommended <u>average</u> crew size would include:

1 foreman who is in charge of the pour

2 laborers to rake ahead of the finishing machine

1 operator of the finishing machine

2 finishers for edging

1 broom and cure man

2 vibrator men

(a man to watch f/w on slab decks)

1-4.6 SPECIAL EQUIPMENT REQUIRED OR ADVISABLE

1. Cooling of concrete in hot weather
   a) Ice chipping machine at the plant or refrigerated water
   b) Fogging of the coarse aggregate stockpiles
   c) Open cover over the aggregate stockpiles
   d) Cool water supply at deck pour
   e) Fogging rebar and forms with cool water ahead of placement
2. Heating and protecting concrete in cold weather
   a) Heat water
   b) Heat coarse aggregate
   c) Cover stockpiles with black plastic (visqueen)

d) Protect completed deck as necessary to maintain temperature requirements. (Possible use of an external heat source.)

3. Back-up equipment for machinery that is critical (bidwell motors, hoses)

4. Possibility of rain?

Concrete deck placement should not be scheduled if inclement weather is impending. However, if there is a chance of rain, precautionary measures should be planned and appropriate materials should be available at the site at all times, such as:

(1) "visqueen"

(2) method of placing and removing visqueen

(3) a plan for getting rid of excess water on the low side

(4) building an emergency bulkhead

1-4.7 CURING EQUIPMENT (Standard Specifications 90-7)

1. Water supply at the site

2. Sufficient supply and pressure to produce a fog mist

3. Fog nozzle

4. Adequate means of applying curing compound

a) The conventional hand pump garden sprayer is not permitted for deck curing compound.

b) Contractor should prove (prior to concrete to concrete placement) the adequacy of his system for applying curing compound to the deck surface (power atomizing spray).

5. Make sure there are no leaks in the hose lines and that the hoses or other components will not drag across the surface.
6. Water for cure and use in deck construction is to conform to the requirements of the specifications.
7. Adequate supply -of moisture retaining coverings.
8. Positive means of keeping the different types of curing compound separate and identifiable.
9. Method of controlling water run-off from eroding falsework footings etc.

1-4.8 CONSTRUCTION DETAILS

Complete review of plans and specifications

1. Skew of abutments or bents versus skew of finishing machine (are you cutting out camber or vertical curve)
2. Is the bridge on a radius or are the edge of decks flared?
3. Superelevation and transitions
4. Cap steel related to deck steel
5. Openings through caps, deck and cap steel clearance
6. Hinges & Prestressing versus deck grades (Appendix 2)
7. Steel girder structures versus deck grades
8. P/S P/C "I" girders - Deck grades and thickness for uneven cambers
9. Variable span lengths - Non parallel abutments or bents
10. Stem and diaphragm stirrup hook location and resulting effect on deck steel placement
11. Specified openings and the effect on screed rail control for

deck grades

12. Longitudinal and transverse joints
13. Paving notch
14. Sidewalk and railing steel layout and height
15. Lane lines
16. Utilities, drains, manholes, etc.

1-4.9 CONSTRUCTION CONDITIONS AND SAFETY

1. Rails and kickboards at edge of deck, finishing and cure bridges and at other locations. (Construction Safety Orders-CSO 1620 & 1621).
2. Runways for foot traffic should not be less than 20 inches wide. (CSO 1624)
3. Proper runways with suitable handrails for access to superstructure when runway is 7.5 feet or more above grade.
4. Will placement or other equipment operate over the public or railway?
5. Will equipment interfere with overhead power or utility lines?
6. Will the public be adversely affected by delivery of concrete? Is there a possibility that placement will be interrupted?
7. Will strike off location and finishing machine length interfere with hand railing? Handrails should be kept in place. (Appendix 1)